

# (12) UK Patent Application (19) GB (11) 2 246 731 (13) A

(43) Date of A publication 12.02.1992

(21) Application No 9114040.0

(22) Date of filing 26.08.1991

(30) Priority data

(31) 02190159

(32) 18.07.1990

(33) JP

(71) Applicant

Nippon CMK Corp

(Incorporated in Japan)

1106 Fujikubo, Miyoshi-cho, Iruma-gun, Saitama,  
Japan

(72) Inventors

Hirotsuka Okonogi

Katsutomo Nikaido

Junichi Ichikawa

Yoshio Nishiyama

(74) Agent and/or Address for Service

Stevens, Hewlett and Perkins

1 Serjeants' Inn, Fleet Street, London, EC4Y 1LL,  
United Kingdom

(51) INT CL<sup>5</sup>

H05K 3/34, B23K 1/08

(52) UK CL (Edition K)

B3R R115 R300

(56) Documents cited

None

(58) Field of search

UK CL (Edition K) B3R

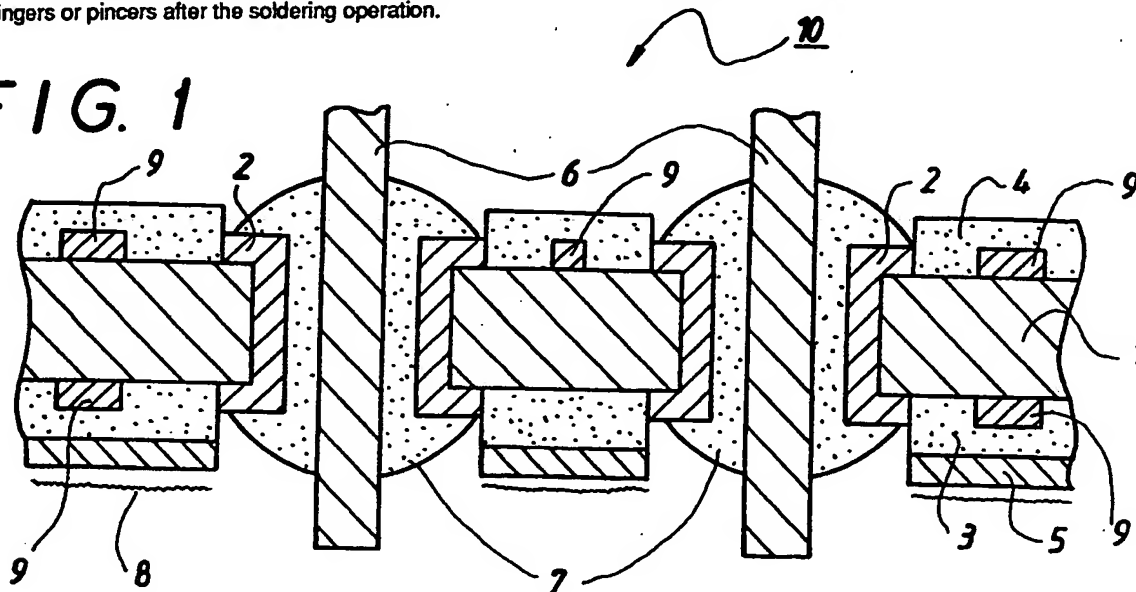
INT CL<sup>5</sup> B23K, H05K

(54) Printed wiring board

(57) A printed wiring board has printed circuits 9 provided on one or both sides of a substrate 1, and solder resist films 3, 4 provided so as to leave the electrical connecting portions of the printed circuits. The solder resist film 4 on the components side of the solder resist films is formed with silicone and/or fluorine/contained resin or an insulating film containing these, and the solder resist film 3 on the solder side has a protective film 5 which can freely be peeled off. In this way, the flux or solder 7 can be prevented from entering and depositing on the components side from a through-hole (not shown) or component insertion hole 2.

The protective film 5 provided on the solder resist 3 on the solder side can readily be peeled off by hand using the fingers or pincers after the soldering operation.

FIG. 1



GB 2 246 731 A

FIG. 1

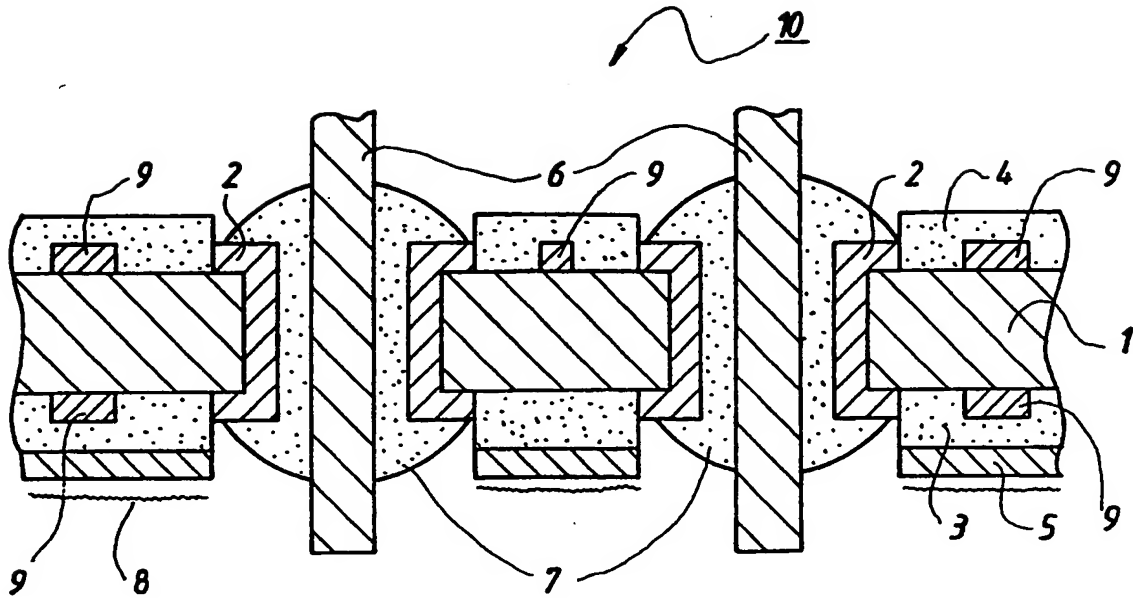
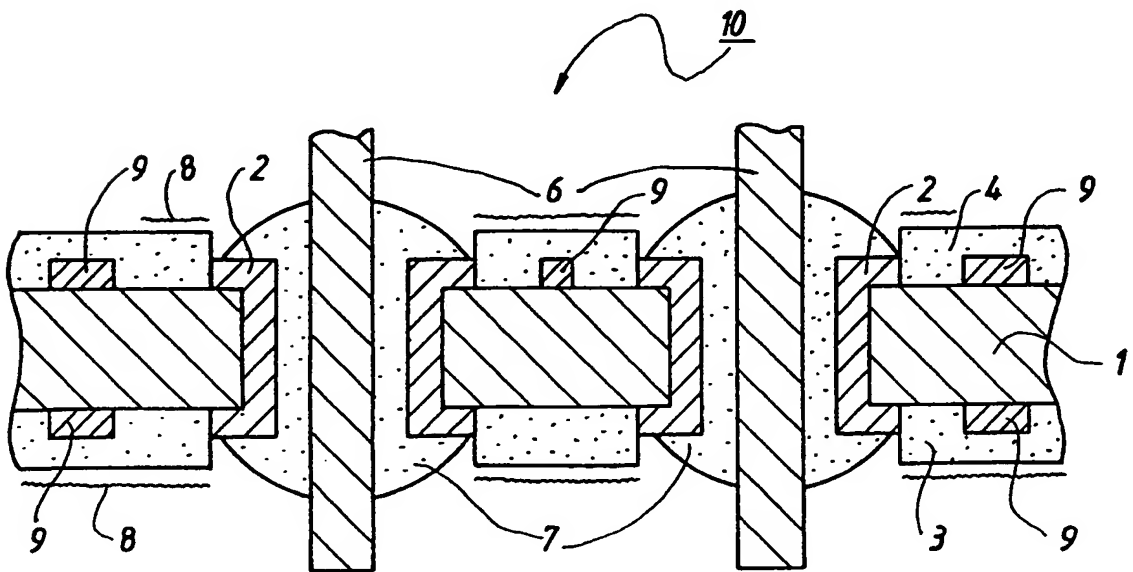


FIG. 2



## PRINTED WIRING BOARD

The present invention relates to a printed wiring board, and particularly to a printed wiring board in which residual flux can easily be removed when parts are mounted.

Usually, a printed wiring board is constructed by forming a desired circuit pattern on an insulating substrate through a conductor, and mounting desired electronic components for the circuit pattern.

Referring to Figure 2 of the accompanying drawings, printed circuits 9 are formed on both sides of an insulating substrate 1 in a printed wiring board 10 and the printed circuits 9 have insertion holes 2 formed therein for allowing the insertion and electrical connection of component leads 6 for mounting a component (not shown).

In addition, on printed circuits 9 of the insulating substrate 1, solder resist 3 on the solder side and solder resist 4 on the component side are deposited except at the electrical connecting portions, respectively.

An electronic component is mounted on the printed wiring board 10 by setting lead 6 of the electronic component in insertion hole 2 and dipping the solder side of printed wiring board 10 in a molten solder bath or a jet-type solder bath to deposit solder 7 on the solder side, thereby electrically and mechanically connecting lead 6 of the electronic component to insertion hole 2.

However, when lead 6 and insertion hole 2 are soldered during the mounting of an electronic component on the printed wiring board 10, the soldering is performed only after a flux is previously applied in order to improve the solder wetting between the two. However, the flux deposits not only on the

whole solder surface but also on the component surface via the through-hole or component insertion hole 2 when the soldering is performed.

5 This residual flux is a factor which reduces the reliability of printed circuits 9 such as their insulating properties and humidity resistance, and there is a defect that a washing treatment by a solvent such as fleon is required to remove the residual flux.

10 In addition, the fleon gas generated in the washing treatment by a solvent such as fleon causes an environmental destruction such as air pollution.

Accordingly, the present invention was developed in view of the defect in the components mounting in the conventional printed wiring board, and seeks to provide a printed wiring board in which the removal of the residual flux can be implemented without requiring a washing step.

20 According to the invention, there is provided a printed wiring board comprising printed circuits provided on one or both sides of a substrate, and solder resist films provided so as to leave the electrical connecting portions of said printed circuits, wherein the solder resist film on the components side of said solder resist films is formed of silicone and/or fluorine-contained resin or an insulating film containing these, and a protective film which can freely be peeled off is provided on the solder resist film on the solder side.

30 The printed wiring board of the invention has the action that flux or solder 7 can be prevented from entering and depositing on the components side from a through-hole (not shown) or component insertion hole 2 provided in the printed wiring board by forming the solder resist on the parts side with silicone and/or  
35 fluorine-contained resin or an insulating film

containing these.

Moreover, the protective film provided on the solder resist on the solder side, which can freely be peeled off, can readily be peeled off by manual work  
5 using fingers or a pincette after the soldering operation, and thus there is an action that the residual flux deposited on the protective film at the time of soldering can be removed through the protective film.

10 In order that the invention may be better understood, an embodiment thereof will now be described by way of example only and with reference to the accompanying drawings in which:-

Figure 1 is an enlarged cross-sectional view  
15 showing in embodiment of the printed wiring board of the present invention; and

Figure 2 is an enlarged cross-sectional view showing the conventional printed wiring board.

An embodiment of the printed wiring board of  
20 the present invention will now be described with reference to Figure 1.

In the drawing, printed wiring board 10 is constructed by forming printed circuits 9 on both sides of an insulating substrate 1 and providing  
25 component insertion holes 2, depositing solder resist film 3 on the solder side by a known technique such as silk screen printing using a solder resist ink which is commonly used, depositing solder resist film 4 on the other parts side by a known technique such as  
30 screen printing using silicone and/or fluorine-contained resin which can prevent the deposition of solder, or an insulating printing ink containing them, and depositing protective film 5, for free peeling, on the solder resist film 3 on the solder side so as to  
35 leave the electrical connecting portions, which protective film 5 has solder heat resistance and is

mainly comprised of vinyl chloride resin or the like.

When an electronic component is mounted on a printed wiring board 10 of such construction, the leads 6 of the electronic component are set in insertion hole 2 and soldered by solder 7 in a manner similar to the above description of Figure 2, and since solder resist 4 on the components side is formed by coating silicone and/or fluorine-contained resin or an insulating printing ink containing them, it repels the flux and solder because of the properties of the silicone or fluorine-contained resin, and hence the deposition of the flux and solder onto the component surface can be prevented.

In addition, since, on solder resist film 3 on the solder side, protective film 5 is formed which can be peeled off by hands or the like, residual flux 8, having been deposited on protective film 5 at the time of soldering, can be removed along with protective film 5 by peeling off protective film 5 using fingers or pincers after the soldering operation.

Although solder resist films 3 and 4 in the above described embodiment have been coated by screen printing, it is also possible to form them by depositing dry films.

In accordance with the printed wiring board of the present invention, the solder resist on the components side can prevent the deposition of the flux or solder onto the components surface when implementing a solder work because of the properties of the silicone or fluorine-contained resin, and the residual flux having deposited over the whole solder surface at the time of soldering can be removed by peeling off the protective film on the solder side because the protective film can be manually peeled off, so that there is an effect that washing is not required and the reduction of the reliability such as

insulating properties and humidity resistance due to the residual flux can be prevented.

Also, as the traditional washing by means of a solvent such as fleon can be eliminated, there is an  
5 effect in preventing environmental destruction such as air pollution.

10

15

20

25

30

35

CLAIMS

1. A printed wiring board comprising printed circuits provided on one or both sides of a substrate, and solder resist films provided so as to leave the electrical connecting portions of said printed circuits, wherein the solder resist film on the components side of said solder resist films is formed of silicone and/or fluorine-contained resin or an insulating film containing these, and a protective film which can freely be peeled off is provided on the solder resist film on the solder side.
2. A printed wiring board as claimed in claim 1 wherein said protective film consists of a protective film having solder heat resistance and mainly composed of vinyl chloride resin or the like.
3. A printed wiring board as claimed in claim 1 wherein the solder resist film on said components side is formed by depositing silicone and/or fluorine-contained resins or an insulating printing ink containing these by means such as screen printing.
4. A printed wiring board substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

25

30

35



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**